



# UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE  
United States Patent and Trademark Office  
Address: COMMISSIONER FOR PATENTS  
P.O. Box 1450  
Alexandria, Virginia 22313-1450  
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/706,925	11/14/2003	David G. Frank	9351-218	7652
1059	7590	05/30/2006	EXAMINER	
BERESKIN AND PARR 40 KING STREET WEST BOX 401 TORONTO, ON M5H 3Y2 CANADA			BELL, BRUCE F	
			ART UNIT	PAPER NUMBER
			1746	
DATE MAILED: 05/30/2006				

Please find below and/or attached an Office communication concerning this application or proceeding.

## Office Action Summary

Application No.

10/706,925

Applicant(s)

FRANK ET AL.

Examiner

Bruce F. Bell

Art Unit

1746

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☐ Responsive to communication(s) filed on \_\_\_\_.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 1-24 and 26-32 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-24 and 26-32 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 14 November 2003 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
  - ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_.
  - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)  
Paper No(s)/Mail Date \_\_\_\_.
- 4) ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date. \_\_\_\_.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: \_\_\_\_.

## DETAILED ACTION

### ***Claim Rejections - 35 USC § 112***

1. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

2. Claims 1-24, 26-29 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claim 1 is vague and indefinite with respect to whether applicant is claiming a fuel cell or an electrochemical cell from the instant claim as set forth, since both are now being instantly claimed. Applicant is requested to change "an electrochemical cell" back to a "fuel cell", as "originally" presented. The electrochemical cell as now presented is broader in scope than in the originally presented claim. Further, the claim as now set forth has no antecedent basis for "the fuel cell" as set forth in set (a) of the claim.

Claims 7, 10, 11, 13-15, 19-22 and 24 lack antecedent basis for the phrases "the fuel cell", "said stack", "the fuel cell assembly" and "the fuel cell stack", respectively for the above claims.

Claim 11 further lacks antecedent basis for "the membrane exchange assembly". Claim 11 is further vague and indefinite with respect to whether the applicant is attempting to claim just the membrane electrode assembly and gas diffusion media on both sides of the proton exchange membrane or if they are attempting to claim the membrane electrode assembly, proton exchange membrane and gas diffusion medium

(all three) on each side of a proton exchange membrane, from the instant claim as set forth.

Claim 12 is vague and indefinite with respect to whether the membrane electrode assembly includes a proton exchange and gas diffusion media on both sides of the proton exchange membrane or whether applicant means that a gas diffusion media is on both sides of the proton exchange membrane which makes up the MEA.

Correction and/or clarification is requested.

***Claim Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

3. Claims 1 –4, 6, 8-10, 23, 27, 28, 30-32 are rejected under 35 U.S.C. 103(a) as being unpatentable over Sasaki et al (6337120) and Lifferth (4050700).

Sasaki et al discloses a process of injection molding of liquid rubbers under vacuum conditions where the vacuum sucks the air out of the closed space where the rubber is injected to flow. See col. 3, lines 40-50. Various liquid rubbers such as liquid silicone rubber, liquid perfluoro rubber, liquid nitrile rubber, liquid ethylene-propylene-diene rubber, or liquid fluororubber. See col. 4, lines 46-58. The liquid rubber has a sealing performance that can be achieved even at relatively low contact sealing pressure and the liquid rubber can contain PTFE powder to yield an excellent anti-gas permeability when required. See col. 4, lines 59-67. A surface of a carbon plate having

a groove is provided along an inner part of an outer periphery of the plated and the groove has a depth in the range of about 0.5 mm to about 3 mm. See col. 5, lines 57-61. The gasket is made by injection molding wherein the nozzle of an injection molding machine is placed at the inlet of a mold to inject the liquid rubber material into the groove area while sucking the air out of the space. The amount of vacuum used is preferably set to not more than 30 Torr, so that the gaskets produced have good bonding strength between the gasket and the carbon plate. The gasket can be produced simultaneously on both sides of the carbon plate by injection molding of the liquid rubber on the plate which has a plurality of holes in the plate. The holes being connected between both the plane surface of the plate. See col. 6, lines 20-41. Two molds are placed together in face to face relationship with an interspace not more than about 2 mm. A nozzle of the injection machine touches onto the inlet, through which liquid rubber enters into the mold, to shut off the space in the mold from the outer environment. The liquid rubber is then injection molded into the vacuumed space to mold the gasket. See col. 6, lines 42-58. Holes penetrating through the sheet in the direction thickness are provided in the groove of the sheet. When liquid rubber is injected onto one of the groove of the surface of the sheet, liquid rubber also simultaneously runs through the holes into the other side of the groove to make another gasket. These gaskets are tightly secured on the sheet because the gaskets engage with the holes. See col. 7, lines 11-18. The sealing material are made of elastic materials so that the sealing materials can sealingly face-contact with another plate at a relatively low contact pressure even if there is somewhat undulation on the surface of

the gasket. Curing or vulcanizing of the sealing materials is carried out after the material infiltrate into the void, so that bonding or adhesion between the sealing materials and the member to be sealed, can be physically and completely achieved. The sealing materials used for various seals such as for separators in fuel cells, modules which combine several fuel cells in one body, cooling plates which remove generated heat during power generation. See col. 8, lines 59-63. Sealing of the fuel cell can be done under a contact pressure less than that normally used. See col. 8, lines 32-38.

Sasaki et al does not disclose assembling of the fuel cell before filling the at least one groove network.

Lifferth discloses a seal made of one or more formed sealant receiving grooves, a fitting connected into the groove or grooves to allow sealant to be injected there through and a sealant material that can be injected through the fitting into the groove or grooves and that will retain its fluid characteristics while remaining in its assigned position. See abstract. The patent discloses that the seal is useful between two mating parts. The groove is injected with a flowable sealant material under pressure through a fitting, until the groove is full of sealant. Addition fittings (ports) in the grooves can be used to remove trapped air in the grooves. See col. 2, lines 9-40. The injected seal is disclosed to be a replacement for conventional seals. See col. 2, lines 62-63. Sealants that may be injected are disclosed to be liquid plastic, liquid rubber, liquid Teflon and liquid nylon. See col. 1, lines 45-47.

The subject matter as a whole would have been obvious to one having ordinary skill in the art at the time the instant invention was made because even though the prior

art of Sasaki et al does not disclose that the fuel cell is assembled, the patent does disclose making the sealing portion integral with the carbon plate in a groove that is formed on a surface of the porous carbon plate and that it is done by injection molding. The prior art of Lifferth discloses a seal being formed in a groove by injection molding a liquid rubber in the groove which retains its fluid characteristics, after the assembly has been mated together. The sealant is selected to be flowable into the grove but is a material that will then harden to the extent necessary to keep from being forced out of the grooves and between the matching faces of the assembly. One having ordinary skill in the art would have the ability to instead of placing a separate plate into a mold to injection mold a seal, to instead assembly the components of the fuel cell and injection mold the seal into the grooves in the fully assembled manner since the prior art of Sasaki et al discloses that a seal made by injection molding in a mold (which an assembled fuel cell would be) can be done under reduced pressures without any adverse effects to bonding strength between the grooves and the carbon plate. Even though Lifferth deals with injection molding of liquid rubber between parts of a flange and a groove of a pipe, Lifferth discloses that it is known in the art of injection molding that this type of seal is known to be used to seal between parts to prevent the escape of fluids, gases or other such materials, and since the liquid rubber is used in both Lifferth and in Sasaki, one having ordinary skill in the art would have the motivation to use such material in the sealing by injection mold of the seal material into an assembled fuel cell, since Sasaki et al discloses that reduced pressures are used to obtain good bond strength between the groove and the carbon plate (separator). Therefore, one having

ordinary skill in the art would be motivated to assemble an entire fuel cell and seal the cell rather than to individually produce the seal in the groove of each carbon plate by itself for the purpose making a seal integral with the cell and making a more precisely fit seal which forms the exact dimensions of the groove network before curling the seal, as shown by the prior art of Lifferth, which uses a liquid rubber material to form the seal. Even though Lifferth does not completely cure the seal, one having ordinary skill in the art based on the Sasaki et al patent would know to fully cure the seal in a fuel cell application. The recitations in the instant claims with respect to cleaning and priming to promote bonding are conventional in the art of injection molding. Therefore, the prior art of Sasaki et al in combination with Lifferth render the applicants instant claims as obvious for the reasons set forth above.

#### ***Double Patenting***

4. Claim 1 provisionally rejected on the ground of nonstatutory obviousness-type double patenting as being unpatentable over claim 11 of copending Application No. 10/712059. Although the conflicting claims are not identical, they are not patentably distinct from each other because the instant claim 1 is encompassed by the invention of claim 11. Both inventions claim a method of forming a seal in a groove network after the assembly of the cell by filling the groove network with a liquid curable seal material.

This is a provisional obviousness-type double patenting rejection because the conflicting claims have not in fact been patented.



***Response to Arguments***

5. Applicant's arguments with respect to claims 1-3, 6, 8, 23, 26-28 and 30 have been considered but are moot in view of the new ground(s) of rejection.

***Conclusion***

6. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than **SIX MONTHS** from the date of this final action.

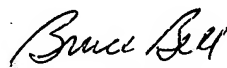
Any inquiry concerning this communication or earlier communications from the examiner should be directed to Bruce F. Bell whose telephone number is 571-272-1296. The examiner can normally be reached on Monday-Friday 6:30 AM - 3:00 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Michael Barr can be reached on 571 272-1414. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Art Unit: 1746

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

BFB  
May 18, 2006

  
Bruce F. Bell  
Primary Examiner  
Art Unit 1746